

What is claimed is:

1. A semiconductor device comprising:
 - a collector layer of first conductive type formed on a semiconductor substrate;
 - a graft base layer of second conductive type formed in a surface region of the collector layer;
 - a first base leading-out region of second conductive type formed on the graft base layer;
 - a second base leading-out region of second conductive type formed on an upper surface and a side surface of the first base leading-out region;
 - a base layer of second conductive type formed on the collector layer;
 - an emitter layer of first conductive type formed in a surface region of the base layer; and
 - an emitter leading-out region formed on the emitter layer.
2. A semiconductor device according to claim 1, wherein the base layer is also formed on the second base leading-out region, and at least part of an impurity concentration profile of the second base leading-out region is smaller than an impurity concentration of the first base leading-out region.
3. A semiconductor device according to claim 1, wherein the first and second base leading-out regions are made of the same material.
4. A semiconductor device according to claim 3, wherein the base layer is also formed on the second base leading-out region, and at least part of an impurity concentration profile of the second base leading-out region is smaller than an impurity concentration of the first base leading-out region.
5. A semiconductor device according to claim 1, wherein the base layer is an epitaxial growth layer.
6. A semiconductor device according to claim 5, wherein the base

layer is made of SiGe.

7. A method for manufacturing a semiconductor device, comprising:
 - forming a collector layer of first conductive type in a semiconductor substrate;
 - forming a first base leading-out region to which impurities of second conductive type are added on the collector layer to form a non-doped region on upper surface and a side surface of the first base leading-out region;
 - forming a base layer of second conductive type on the non-doped region and the collector layer;
 - thermally diffusing the impurities of second conductive type in the first base leading-out region into the non-doped region and the collector layer immediately below the first base leading-out region;
 - forming an emitter layer of first conductive type in a surface region of the base layer; and
 - forming an emitter leading-out region on the emitter layer.
8. A method for manufacturing a semiconductor device according to claim 7, wherein the first and second base leading-out regions are made of the same material.
9. A method for manufacturing a semiconductor device according to claim 7, wherein at least part of an impurity concentration profile of the second base leading-out region is smaller than an impurity concentration of the first base leading-out region.
10. A method for manufacturing a semiconductor device according to claim 7, wherein the base layer is formed by epitaxial growth.
11. A method for manufacturing a semiconductor device according to claim 10, wherein the epitaxial growth is non-selective epitaxial growth.
12. A method for manufacturing a semiconductor device according to claim 10, wherein the base layer is made of SiGe.

13. A method for manufacturing a semiconductor device, comprising:
forming a collector layer of first conductive type in a semiconductor substrate;
forming an element isolating region in the collector layer;
forming a dielectric pattern on part of the collector layer;
forming a first base leading-out region to which impurities of second conductive type are added on the collector layer where the dielectric pattern is not formed to form a first non-doped region on the first base leading-out region;
removing the dielectric pattern by wet-etching;
forming a second non-doped region on a side surface of the first base leading-out region and a side surface of the first non-doped region;
forming a base layer of second conductive type on the first and second non-doped regions and the collector layer;
thermally diffusing the impurities of second conductive type in the first base leading-out region into the first and second non-doped regions and the collector layer immediately below the first base leading-out region;
forming an emitter layer of first conductive type in a surface region of the base layer; and
forming an emitter leading-out region on the emitter layer.
14. A method for manufacturing a semiconductor device according to claim 13, wherein the first and second base leading-out regions are made of the same material.
15. A method for manufacturing a semiconductor device according to claim 13, wherein at least part of an impurity concentration profile of the second base leading-out region is smaller than an impurity concentration of the first base leading-out region.
16. A method for manufacturing a semiconductor device according to claim 13, wherein the base layer is formed by epitaxial growth.
17. A method for manufacturing a semiconductor device according to claim 16, wherein the epitaxial growth is non-selective epitaxial growth.

18. A method for manufacturing a semiconductor device according to claim 16, wherein the base layer is made of SiGe.